Park News

Great Basin National Park
National Park Service
U.S. Department of the Interior

The Midden

The Resource Management Newsletter of Great Basin National Park

New Park Records for Two Reptile Species

By Meg Horner, Supervisory Biological Science Technician

Two reptile species were documented at new park localities in 2009 and 2010: collared lizard (*Crotaphytus bicinctores*) and Sonoran Mountain kingsnake (*Lampropletis pyromelana*).

An adult collared lizard was photographed in May of 2009 in the Lehman Creek watershed on a rocky, south-facing slope in sagebrush and pinyon-juniper (Figure 1). Another collared lizard was found in the same area during reptile surveys in the spring of 2010 at an elevation of 7,000 feet. Collared lizards have been documented at lower elevations in two other park watersheds that contain suitable habitat. Across its natural range, this species has been documented from sea level to approximately 7,500 feet.

The first kingsnake ever documented inside park boundaries was found in July of 2010 on the west side of the park at 8,200 feet (Figure 2) by park staff. The snake was collected, marked with a passive integrated transponder (PIT) tag, measured, weighed, sexed, and returned to its original location. There have been several historic and anecdotal kingsnake sightings in the park which spurred resource staff to initiate annual kingsnake surveys. However, the first reliable park record did not occur during these annual surveys despite five years of annual weeklong surveys and 6,392 search hours logged by park staff and volunteers. Five kingsnakes [2006 (n=2); 2010 (n=2); 2011 (n=1)] have been found on the west side– with only one located inside the park boundary.

Figure 1. Collared lizards have recently been documented in the park.

The discoveries of these two reptile species are noteworthy for two reasons. First, the collared lizard observations support predicted upward shifts in species distributions as a response to changing climate conditions. Second, the time and effort required to document a cryptic species like the Sonoran Mountain kingsnake within suitable habitat inside the park underscores the assumed rarity of this species in the central Great Basin.

The park's 6th annual kingsnake round-up was held the week of May 21st to survey for Sonoran Mountain kingsnakes in the park and surrounding area. Park staff and volunteers from Nevada, Utah, and Florida helped log over 100 search hours and found two kingsnakes outside the Park. Annual kingsnake surveys are held every May. Anyone interested in participating should contact Bryan Hamilton at 775-234-7563 for more details.

NPS Photo by Meg Horner

Figure 2. The first Sonoran Mountain Kingsnake found in Great Basin National Park.

And if you see a kingsnake or other interesting wildlife while visiting the park, please fill out a wildlife observation form, available at both park visitor centers.

In This Issue

Five New Species of Flies Discovered

By Gretchen Baker, Ecologist

Five new species of flies in Great Basin National Park have recently been identified and named. These flies were all found in caves and mines and are in the family Phoridae. These Phorid flies, when threatened, often run across a surface rather than fly away, hence the other common name: scuttle flies. About 4,000 species of scuttle flies are known in 230 genera. They are tiny, only 0.5 to 6 mm in length, and hump-backed.

Dr. Henry Disney from the United Kingdom, a specialist in Phoridae, identified them, and cave biologists Steven Taylor, Michael Slay, and Jean Krejca assisted with the publication in *Subterranean Biology*.

The five new species fall within two genera: *Aenigmatias* and *Megaselia*, with the latter composed of a huge number of species from around the world. The new species are *Aenigmatias bakerae* Disney, *Megaselia excuniculus* Disney, *M. krejcae* Disney, *M. folliculorum* Disney, and *M. necpleuralis* Disney.

All of the flies were collected in the twilight or entrance zones of the caves or mines. These areas had humidity ranging from 52.5% to 82.6%, which is higher than the average annual relative humidity of 43.8% at the nearby Mather Overlook weather station. This suggests that the flies may be using the caves and mines as a refuge from the drier aboveground conditions.

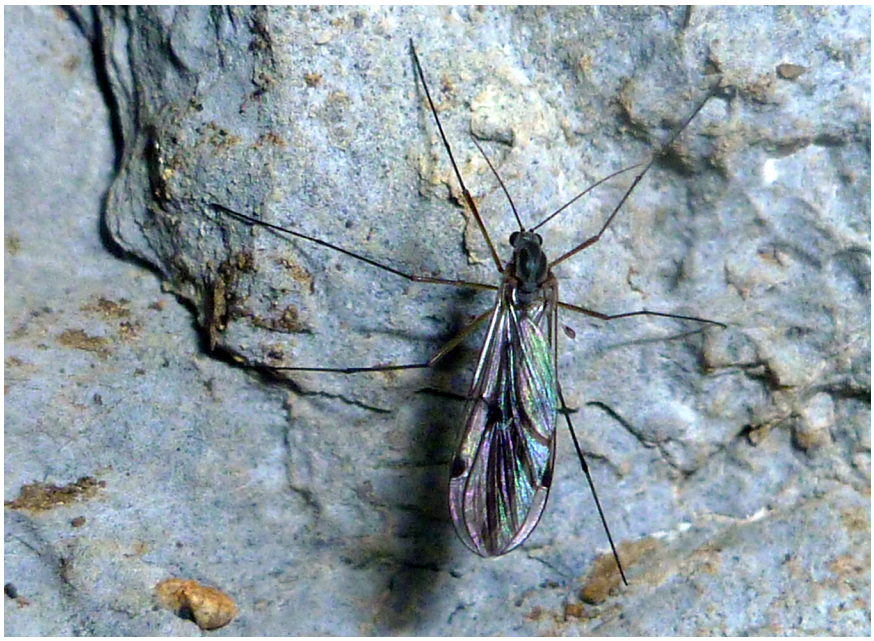
Additional study is needed to learn more about the life history of these species.

Surveyors visited some of the sites only once for this inventory effort. The large number of new species from the limited sampling make it likely that additional species remain to be discovered with more sampling effort.

To read the complete paper, please visit: http://www.pensoft.net/journals/subtbiol/article/2511/

NPS Photo

Looking for new species during a cave bioinventory. New species have been found in several park caves, including Lehman Cave, wet caves, and high elevation caves.



NPS Photo by Gretchen Baker

An unidentified fly on a cave wall. More new species of flies are expected to be found in the park with additional sampling efforts.

Newly Discovered Pure Bonneville Cutthroat Trout Population

By Jon Reynolds, Biological Science Technician

For much of the last 30 to 40 years it was believed by many scientists and management agencies that pure strains of Bonneville cutthroat trout (BCT) were extinct due to competition and hybridization with nonnative trout. Recently, several small source populations have been discovered and genetically analyzed to ensure that they are in fact pure BCT with no rainbow trout introgression. These genetically pure populations of BCT play a crucial role in the reintroduction efforts to restore BCT throughout their historic range.

Before 1999 only two genetically pure sources of BCT were thought to have existed in the Snake Range: Hendrys Creek in the North Snake Range and Pine and Ridge Creeks (considered one system) in the South Snake Range. However, an additional pure BCT source was found. Genetic testing conducted in 1999 and 2000 by Brigham Young University (BYU) and the University of Montana showed that the population of trout residing in Mill Creek was one hundred percent pure BCT. This discovery increased the number of genetically pure BCT source populations within the Snake Range to three. Since 2000, Great Basin National Park and the Nevada Department of Wildlife (NDOW) have used the Hendrys Creek and Mill Creek populations for several reintroduction efforts throughout the Snake Range. Both agencies have been working cooperatively to monitor the reintroduced and source populations of BCT.

In 2010, NDOW discovered trout in Willard Creek that possessed strong BCT characteristics and sent 30 fin clips to BYU for genetic testing. In September 2011, the results came back in a preliminary genetics report as one hundred percent pure BCT. That makes the Willard Creek population the fourth pure BCT source population verified in the Snake Range.

Both the newly discovered Willard Creek and the Pine and Ridge populations are located on the west side of the South Snake Range which is outside the BCT's historic range. Therefore their origin is somewhat of a mystery. The streams were originally fishless and the BCT could have been transplanted by miners, sheepherders, or ranchers. Regardless of how they arrived, the two pure populations of BCT still exist on the west side of the South Snake Range and may one day play a role in the reintroduction of BCT within their historic range.

NPS Photo

A pure Bonneville cutthroat trout. A new pure population was found recently in a stream adjacent to the park.

The Nevada Climate-Ecohydrological Assessment Network

By Lynn Fenstermaker, Desert Research Institute

The Universities of Nevada (Las Vegas and Reno) and the Desert Research Institute have collaborated with land owner agencies in Nevada to establish two elevational transects of monitoring stations collectively named NevCAN.

The primary purpose of NevCAN is to collect data for long-term assessment of climate variability and change and its impact on ecological and hydrological processes and function in Nevada. This effort is funded by the National Science Foundation's Exploratory Program to Stimulate Competitive Research (EPSCoR) under grant number EPS-0814372 and Nevada State research funds.

NevCAN consists of two transects of monitoring stations, one in east central NV, the Snake Range Transect, and one in southern NV, the Sheep Range Transect (Fig. 1). A standardized set of sensors are installed at each station (Fig. 2) to monitor key environmental variables that assess climate variability and its impact on hydrologic and ecosystem function. A webcam is mounted on each tower to provide real time assessment of site conditions as well as archival photographs to help assess plant phenology, snow depth and snow melt timing.

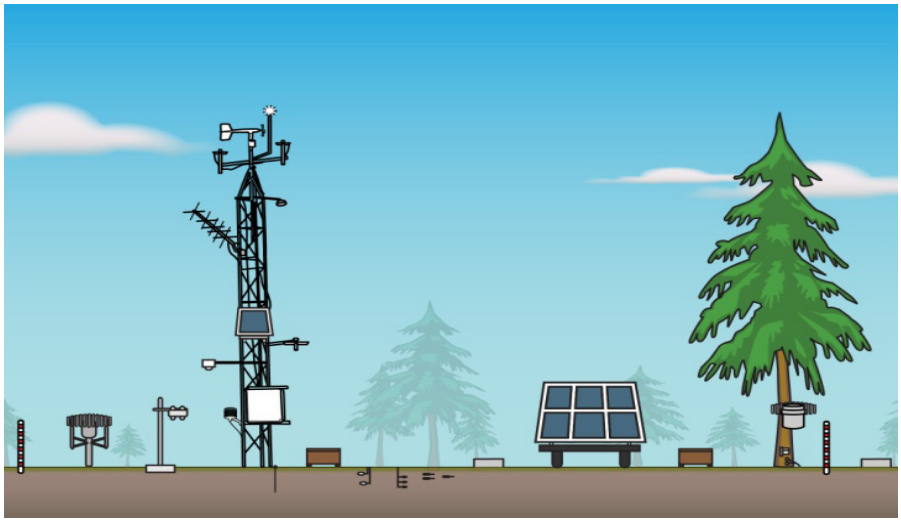


Figure 2. Instrumentation General Schematic; from left to right: snow stake, Geonor precipitation sensor, net radiometer, tower, battery enclosure (brown box), soil temperature and moisture sensors, runoff collector (small gray box), solar panel, enclosure, tree sap flow and point dendrometer, under canopy snow stake and another runoff collector. On the tower are (top to bottom): wind direction/speed, lightning rod, quantum sensor and pyranometer, PTZ webcam, Yagi antenna for AFAR radio, solar panel, NDVI sensor, ultrasonic snow depth sensor, datalogger enclosure (white box) and air temperature/relative humidity sensor.

The Snake Range transect has seven monitoring stations beginning at 1790 m on the west side of the range, 3355 m at the western subalpine site and ending at 1560 m on the eastern side of the range. An 8th monitoring station at 1564 m (Salt Desert West) will be incorporated into the Snake Range transect as funding permits; this site has had

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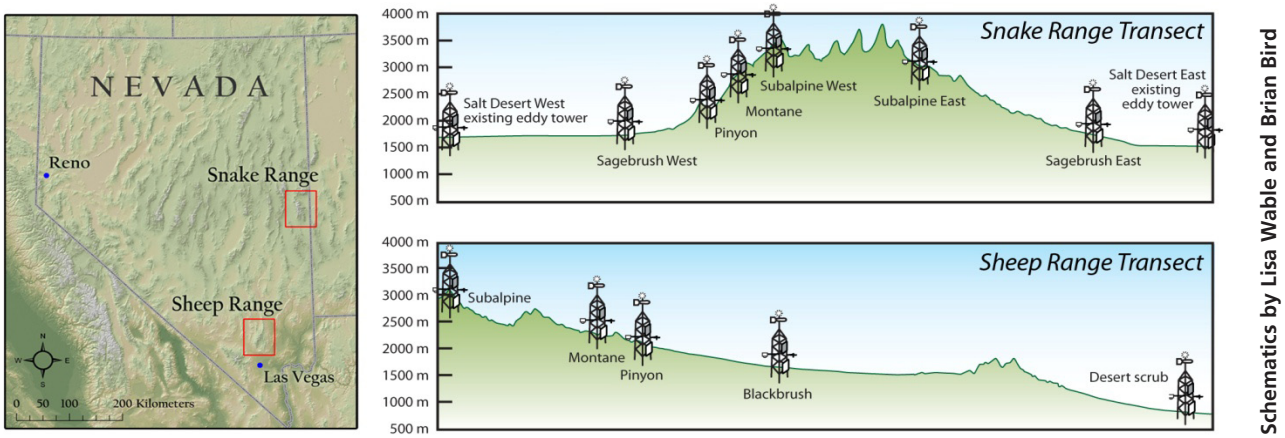


Figure 1. Location of the two NevCAN Transects within the Snake Range and Sheep Range.

NevCAN (continued)

an operational eddy covariance system since 2007.

The Snake Range transect encompasses several collaborating land holder agencies including: the Long Now Foundation, Bureau of Land Management, Great Basin National Park and the Nevada Land Conservancy.

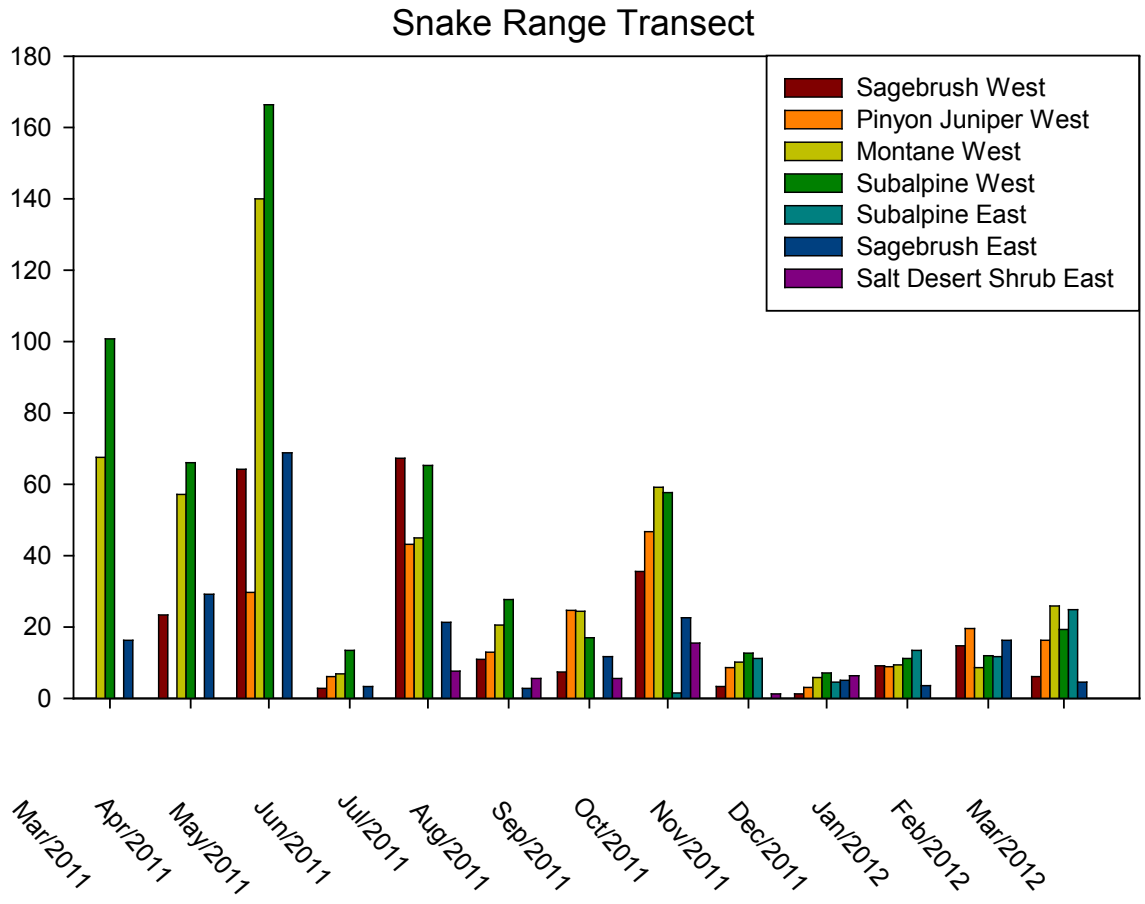
The Sheep Range transect has five monitoring stations beginning at 900 m and ending at 3015 m. All of the monitoring stations are located on land managed by the U.S. Fish and Wildlife Service and several of the stations are co-located with Natural Resource Conservation Service (NRCS) Soil Climate Analysis Network (SCAN) sites.

Networking capabilities provide real time transmission of data and webcam images to the Nevada Climate Change Data Portal where any interested person may download data free-of-charge. One of the primary NevCAN goals is to make climate change science and data accessible to all and thus enhance understanding of climate variability and its impacts. For information about NevCAN and the developing data archive please go to: *http://sensor.nevada.edu*

25th Park Dedication Anniversary!

Come celebrate 25 years of service at the Park's Open House on August 25.

More details are on the last page and on the park website: www.nps.gov/grba



Total monthly precipitation for each Snake Range Transect stations (as they became operational) from March 2011 through March 2012. Note: the site located within the Great Basin National Park is the Subalpine East site.

Documenting the History of Abandoned Mine Lands

By Karla Jageman, Archeologist and Eva Jensen, Cultural Resource Program Manager

Great Basin National Park is in the midst of a two year project to identify, locate, document, and prepare a historic context for abandoned mining sites and features as a part of the Abandoned Mine Lands (AML) program. The goal of this project is to create a complete and accurate inventory of areas in the park where mineral exploration and mining activity occurred. With a complete inventory of these mines, the park will be able to evaluate safety concerns and apply for funding to make the mines safer. Natural and cultural resource staff are working together to create this inventory using historic documents and geologic maps to identify known mining claims and mineral resource areas that might have been exploited.

For cultural resource staff, the historic research will provide information for a historic mining context including how these sites relate to mining areas outside the park. This context will guide the evaluation of the historic sites and help determine how to make the mines safer while protecting the most important historic features.

Preliminary historic research indicates mining began in the vicinity of what is now Great Basin National Park around 1869 with the discovery of silver and copper-lead antimony. Gold was first discovered in 1872 and tungsten in 1885. Other minerals that were mined in and around the park include beryllium, tourmaline, and phosphate. Between 1869 and 1900 six mining districts were formed in this area. These were the Lexington, Mount Washington, Osceola, Shoshone, Snake, and Tungsten Mining Districts. The majority of the mining districts contained tungsten and silver. The Osceola Mining District was best known for its gold and the Mount Washington Mining District for its beryllium and tungsten. Mining continued in the park into the middle of the 20th century. After creation of the park, mining claims were examined. Where there was no commercial potential for mineral extraction, the claims were invalidated. Mining operations outside of the park continue today, most notably at the Osceola Mine.

NPS Photo by Karla Jageman

Figure 1. Recording a mining adit found in the backcountry.

During the first phase of the project Cultural Resource staff visited archive repositories and located historic records and photographs for mines within the park. In the 2011 field season, Cultural and Natural Resource Management staff conducted surveys of many areas of the park known to have mining features or claims. Mines and features were documented with GPS satellite mapping systems. Data was downloaded and compared with historic mining records, claim maps, and geologic data. During the survey several previously undocumented mining features were located. These included several mining prospecting trenches and pits, a shaft, and two adits. When compared with historic records, the features correspond to known, but previously undocumented historic mines. With this new information the park will be

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Documenting the History of AMLs (continued)

able to take the appropriate measures to make these mines safer and preserve the integrity of an important part of Nevada's history.

Mines are located in both easily accessible areas in the front country and in the backcountry of the park. It is important for park visitors and staff to remember that these mining areas may be unstable. Never enter or explore an open adit or shaft. Stay away from the area. The ground around these mining features may be unstable. It is important to remember that these mining features, although small on the surface, may be yards or miles long or deep, with no indication of their actual length or depth on the surface.

NPS Photo by Eva Jensen

Figure 2. Partially collapsed mining adit in the backcountry.

This project will provide the most complete inventory possible, but there may be areas that were never documented through claims or during survey. If you see mining features on the landscape tell Great Basin National Park staff--you may have discovered an historic mine.

Recent Publications about Great Basin National Park

Baker, G. M., S. J. Taylor, M. A. Horner, J. K. Krejca, M. E. Slay, and B. M. Roberts. 2012. Biodiversity in high-elevation caves in Great Basin National Park IN V. Stratford, Editor. 2012. Proceedings of the 20th National Cave & Karst Management Symposium. Midway, Utah: The National Cave & Karst Management Symposium.

Derkarabetian, S., D. B. Steinmann, and M. Hedin. 2010. Repeated and time-correlated morphological convergence in cave-dwelling harvestmen (opiliones, Laniatores) from montane Western North America. PLoS ONE 5(5): e10388. doi:10.1371/journal.pone.0010388

Disney, R. H. L., S. J. Taylor, M. E. Slay & J. K. Krejca. 2011. New species of scuttle flies (Diptera: Phoridae) recorded from caves in Nevada, USA. Subterranean Biology 9: 73-84. Available at: http://www.pensoft.net/journals/subtbiol/article/2511/

Hamilton, B. T., R. Hart, and J. W. Sites Jr. In press. Feeding ecology of the milksnake (*Lampropeltis triangulum*, Colubridae) in the western United States. Journal of Herpetology.

Hamilton, B. T., T. Warfel, and M. Cage. 2011. Geographic distribution Squamata – snakes *Crotalus mitchellii pyrrhus*, speckled rattlesnake. Herpetological Review 42:572.

Horner, M., and B. T. Hamilton. 2011. *Pituophis catenfir* (Gopher Snake) diet. Herpetological Review 42:619.

Kitchen, Stanley G. 2010. Historic fire regimes of Eastern Great Basin (USA) mountains reconstructed from tree rings. Ph.D. Dissertation. Brigham Young University: Provo, Utah. 173 p.

Van Hoesen, J. G. and R L. Orndorff. 2011. The morphology and spatial distribution of Late Quaternary periglacial landforms, Snake Range, Nevada: A GIS-based approach to prioritizing field sites. Journal of the Arizona-Nevada Academy of Science. 43(1): 48-60. doi: 10.2181/036.043.0107

Aspen Stand Condition Assessment

By Margaret Horner, Supervisory Biological Science Technician and Bryan Hamilton, Wildlife Biologist

Quaking aspen (*Populus tremuloides*) is the most widely distributed tree species in North America. Aspen stands support high plant diversity, provide essential habitat for wildlife, maintain soil moisture, serve as natural fire breaks, and augment water yields. Elk and deer depend on aspen stands and productive understories for cover and forage. Mature aspen stands provide habitat for breeding birds. In addition, due to their susceptibility to certain diseases (e.g. heart rot), aspen stands provide nesting habitat for primary and secondary avian cavity nesters. Aspen stands are also highly valued for their aesthetic and recreational value in the semiarid West.

Aspen are declining in many parts of the western United States. Although several factors are contributing to aspen declines, the greatest impact on aspen health has been fire exclusion. Historically, conifer encroachment was balanced by frequent fires, often ignited by Native Americans. A century of fire exclusion has greatly decreased early seral stages of aspen and left aspen systems vulnerable to conifer encroachment and loss of aspen clones.

Aspen occur across the Great Basin, and aspen cover in Nevada is estimated at only one percent. Although aspen are an important park ecosystem, the dynamics, distribution, condition and health of park aspen stands was not known. To better understand the condition and composition of aspen, Great Basin National Park and The Nature Conservancy (TNC) collaborated to map park aspen stands, determine their condition, and make recommendations for aspen management and restoration. This project was funded through the Southern Nevada Lands Management Act Round 9, Eastern Landscape Restoration Initiative.

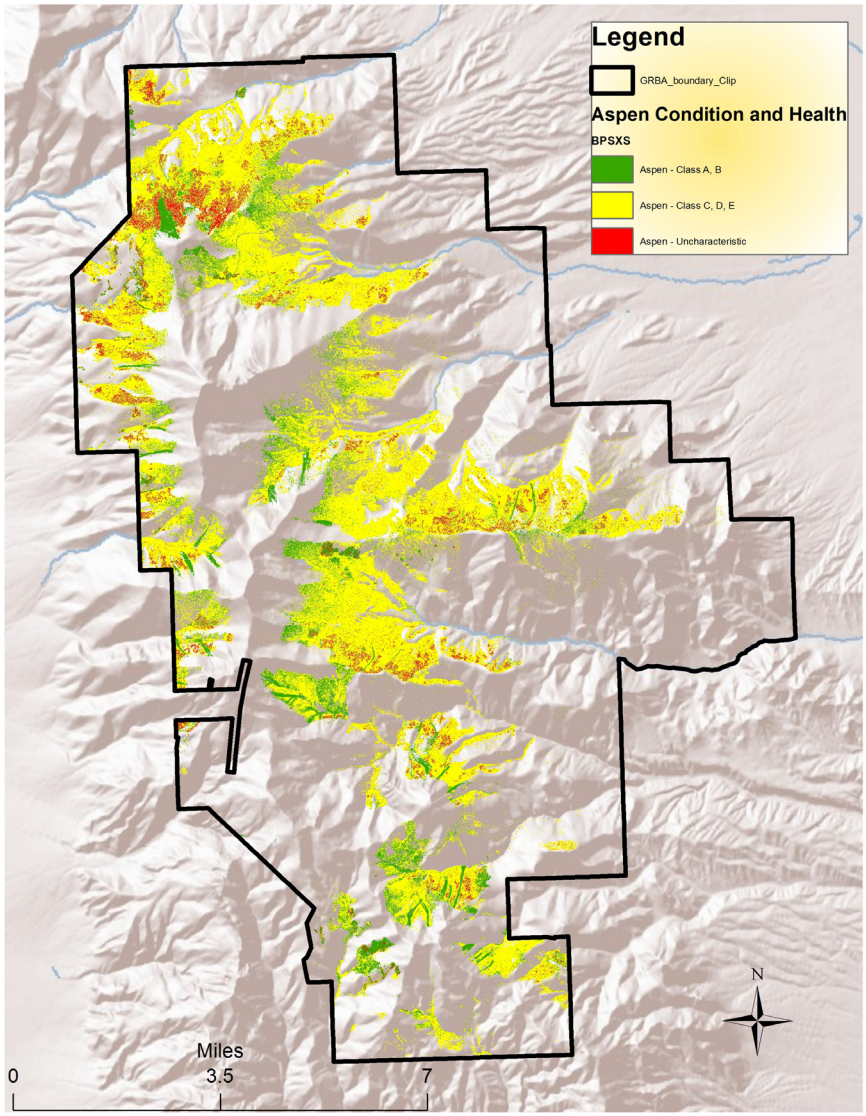

Figure 1. Aspen stands currently cover 25% of Great Basin National Park. Late successional (Class C, D, E) and uncharacteristic classes are currently overrepresented and early successional classes (Class A,B) are underrepresented.

Aspen ecosystems cover 25% of Great Basin National Park and are represented by three

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Aspen Stand Condition Assessment (continued)

biophysical settings: stable aspen woodland (570 acres), seral aspen (8,110 acre), and seral subalpine aspen (11,320 acres). Aspen stands are currently in moderate condition (63% ecological departure; Figure 1). Current aspen condition is due to an over representation of late successional classes, under representation of early classes, poor regeneration and recruitment, and a loss of aspen clones on 1,229 acres. The current heath and condition of aspen stands is primarily due to fire exclusion.

Without active management, aspen condition will continue to decline. The conversion of aspen to mixed conifer is predicted to result in permanent loss of aspen from over 10,000 acres within 50 years. Wildland fire use and prescribed fire are recommended for mid to late-succession classes for all aspen systems to correct ecological departure and prevent loss of aspen.

With widespread use of prescribed fire, the health of park aspen stands is projected to dramatically improve. These management actions will reduce ecological departure to 20 percent, increase early seral stages and regeneration, reduce conifer encroachment, and increase habitat for wildlife.

Aspen management will be included in a Landscape Level Vegetation Management Plan for Great Basin National Park. Look for this plan to be released for public comment in the next year.

Baker Lake Fish Genetics

NPS Photo

The cutthroat trout in Baker Lake were tested for genetic purity in 2011.

By Mark Pepper, Fisheries Biologist

Over the 2010 and 2011 field seasons, fin clips were taken from a subset of each of the Bonneville cutthroat trout populations within the South Snake Range (the park) and the North Snake Range (Mt. Moriah Wilderness area). All populations within the Snake Range came back as pure BCT with no signs of introgression with rainbows or other cutthroats.

For a long time park staff has thought that Baker Lake contained both eastern brook trout and Lahontan cutthroat trout (LCT) but genetic testing was never used to confirm the presence and purity of the LCT. In 2011 while collecting fish for another project, two suspect LCT were collected and sent to Dr. Dennis Shiozawa at Brigham Young University for testing.

In September 1985, almost one year before the creation of Great Basin National Park, 2,500 Lahontan cutthroat trout fry of the Independence strain were released in Baker Lake by the Nevada Department of Wildlife. These fry were three-quarters inches long, with 2550 individuals to the pound.

Twenty-seven years later there is still a successful self-sustaining population, verified to be pure Lahontan cutthroat trout. Lahontans are native to the tributaries of ancient Lake Lahontan, in which remnant Pyramid and Walker lakes still remain in western Nevada.

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The Midden is the Resource Management newsletter for Great Basin National Park.

A spring/summer and fall/winter issue are printed each year. *The Midden* is also available on the Park's website at www.nps.gov/grba.

We welcome submissions of articles or drawings relating to natural and cultural resource management and research in the park. They can be sent to:
Resource Management,
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Or call us at: (775) 234-7331

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What's a midden?

A midden is a fancy name for a pile of trash, often left by pack rats. Pack rats leave middens near their nests, which may be continuously occupied for hundreds, or even thousands, of years. Each layer of trash contains twigs, seeds, animal bones and other material, which is cemented together by urine. Over time, the midden becomes a treasure trove of information for plant ecologists, climate change scientists and others who want to learn about past climatic conditions and vegetation patterns dating back as far as 25,000 years. Great Basin National Park contains numerous middens.

Great Basin National Park

25th Anniversary of Park Dedication

Join us to celebrate a quarter century of Great Basin National Park. A special program and exhibits will be presented at the Great Basin Visitor Center the morning of August 25, 2012. See how the park has changed since its dedication to today.

Pick up a guide to explore the improvements along the Wheeler Peak Scenic Drive and Strawberry Creek. As night falls, the Lehman Caves Visitor Center becomes dark night sky central. Learn about and view the beautiful night sky with our dark sky team and park-provided telescopes.

A few highlights from the last 25 years:

-Resource management staff increased from four in 1986 to fourteen in 2012

-Over 10 species new to science have been discovered in the park

-Bonneville cutthroat trout have been restored to four park streams and verified pure in a fifth

-Sagebrush restoration treatments on over 600 acres

-Weed control on over 300 acres

-Cultural resource program developed and expanded

-Over 180 archeological sites recorded

-Over 300 museum collections accessioned

-Over 8,000 artifacts and archive documents curated and catalogued

-160 acres of Abandoned Mine Land and 15 miles of roads reclaimed

-Over 20 caves mapped or remapped

-Paleontology inventory started

JOIN US ON AUGUST 25 TO LEARN MORE!

Upcoming Events:

August 11 Meteor Viewing Party Up to 60 meteors per hour are expected

August 25 Park Anniversary Celebrate the 25th anniversary of the park's dedication at the open house!

September 1 & 2 Special Astronomy Events

May 25-September 3 Lehman Cave Tours daily at 8:30, 9:00, 10:30, 11:00, 12:20, 1:00, 2:00, 2:30, 3:00 and 4:00. September - May: Tours at 9:00, 11:00, 1:00, and 3:00. Advance ticket sales 775-234-7517.

Visitor Center open daily except Thanksgiving, Christmas, and New Years Day

Astronomy Programs every Tuesday, Thursday, and Saturday night through Labor Day weekend